



ANL's
Michael
Thackeray

Research Highlights . . .

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Science and Technology Highlights from the DOE National Laboratories

Livermore researchers develop gun truck armor kits

Under funding from the Defense Advanced Research Projects Agency and in collaboration with the U.S. Army, gun truck armor kits developed by DOE's [Lawrence Livermore National Laboratory](#) researchers are now providing convoy protection for American troops on the roads of Iraq. Livermore researchers have created a modular, easy-to-assemble armor protection kit that, with the addition of several machine guns, allows the military to convert five-ton supply trucks into gun trucks to protect convoys. To date, some 31 trucks have been outfitted with the armor protection kits and are being used in convoys on Iraqi roads, with plans for the assembly of dozens more gun truck kits in the near future. Each gun truck kit provides a wall of protection around the back of the truck and for the truck cab. Each side wall is topped by two-foot by two-foot sections of transparent armor to protect machine gun operators.

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Gasoline/diesel study available

[NREL](#) researcher Doug Lawson presented findings from an ongoing DOE Gasoline/Diesel Particular Matter (PM) Split Study during a live Webcast sponsored by the California Air Resources Board on Sept. 7. The study was designed to measure the contribution of tailpipe emissions from gasoline and diesel-powered motor vehicles to air pollution in Southern California. The study allowed researchers to measure the influence fuels and lubrication oil emissions from gasoline- and diesel-powered vehicles have on air quality and human health. Data collected during the study will be used by agencies to verify how accurate their emission inventories are.

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Fueleconomy.gov enjoys a heyday

A website maintained since October 1999 by DOE's [Oak Ridge National Laboratory](#) for the Energy Department and the Environmental Protection Agency is enjoying some of its heaviest traffic. Its subject: fuel economy. Since the recent rises in gasoline prices, the [fueleconomy.gov](#) website has seen a correspondent rise in user sessions. The site, which typically averages from 20,000 to 30,000 user sessions a day, charted more than 160,000 user sessions on September 1. Maintained by ORNL's Fuel Economy Information Program as part of DOE's Clean Cities Program, the site is a guide to the most fuel-efficient new and used vehicles and offers the public tips on how to achieve the best fuel economy.

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Membrane, sorbent technologies earn patents

Two scientists at DOE's [National Energy Technology Laboratory](#), Mary Ann Alvin and Ranjani Siriwardane, were recently awarded patents for their work with membranes and sorbents, respectively. Mary Ann Alvin described advanced composite metal/ceramic structures for the separation of hydrogen from high-temperature process-gas streams for use in integrated gasification combined cycle, pulverized fluidized bed combustion, or alternate gas separation applications. Ranjani Siriwardane's novel method made a low-cost carbon dioxide absorbent by treating substrates with an amine and/or ether comprising at least 50 weight percent of the sorbent. The sorbents can be regenerated by heating them over 35 degrees centigrade.

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New tool gives emergency responders access to info

Savannah River National Laboratory is participating, along with the University of South Carolina and the Environmental Protection Agency, in a NASA funded project to give hazard response personnel better access to information they need for decision-making. The project is entitled "Development of Remote Sensing-assisted Natural and Technological Hazards Decision Support Systems (DSS)." This DSS will access and process available and relevant information to support decision-making by hazard response personnel. The system will include information on available remote sensing resources that can be used to track and/or predict direction that a hazardous material release will take, and predict the damage, if any, that will occur.

The project is led by Dr. John Jensen of USC and three co-principal investigators from that institution. Dr. John Gladden of the Environmental Sciences and Technology Department leads the SRNL team, while two investigators from the Environmental Protection Agency and one from NASA make up the remainder of the team.

The research will concentrate on four sub-projects that are especially important in the hazard emergency response cycle:

- predictive modeling of human risk and vulnerability to natural hazards in areas surrounding the event using a new and innovative decision support system (DSS),
- natural and technological hazards event planning and disaster response using a new and innovative DSS that identifies all of the remote sensing assets available for analysis,
- demonstration of a near real-time damage assessment for natural hazards and digital image processing of specified imagery, and
- improved management of technological hazards focusing on the development of a new remote sensing-assisted hazardous waste site monitoring DSS.

SRNL's role in the project is focusing on the development of high resolution (e.g. hyperspectral) remote sensing methodologies to detect imminent failure of closure caps, like those used to close and protect areas where hazardous and radioactive waste has been disposed.

Various failure modes were induced in the experimental capping systems. SRNL and USC researchers will use a combination of Light Detection and Ranging (LIDAR) techniques to provide fine scale topographic data and hyperspectral data to detect differences in vegetation health, and then will analyze the data to detect and confirm areas where the closure cap has settled or sunk. Detecting these incidents of subsidence, as it is called, is important because subsidence can be a precursor to the release of contaminants buried beneath the cap. The hypothetical release of contaminants will be analyzed in the remaining hazard analysis tasks.

Submitted by DOE's Savannah River National Laboratory

SOUTH AFRICA STREET HONORS ANL BATTERY RESEARCHER

Visitors to the new Innovation Hub in Pretoria, South Africa, can drive down a street named after Michael Thackeray, of DOE's Argonne National Laboratory.

Thackeray is one of 11 notable South African scientists and innovators to be honored with his own street name. The Innovation Hub is the first science park in Africa.



Michael Thackeray

Thackeray, a materials scientist in Argonne's Chemical Engineering Division, is perhaps best known for his research on electrode materials for lithium batteries; the technology he developed helps power everyday objects like cellular telephones. The materials technology was commercialized while Thackeray worked for the Council for Scientific and Industrial Research (CSIR) in South Africa. Thackeray was honored alongside his former CSIR colleague, Johan Coetzer, the pioneer of sodium-metal chloride ("Zebra") battery technology.

Around \$50 million has already been invested in the Innovation Hub, one of 11 big projects in an initiative to invest in the economic infrastructure of the Gauteng province, in which Pretoria, or Tshwane, is located. Thackeray said the province has long been a powerhouse of the science and technology that has come out of the country.

Thackeray was born in Pretoria and graduated from the University of Cape Town. He said his return trip to South Africa was especially heartwarming because the country was making great strides forward, despite its racially divided and volatile past.

Thackeray said, "Through the leadership of previous presidents Nelson Mandela and F.W. DeKlerk, who negotiated a remarkably peaceful transition of political power a decade ago, the people have come together in a really positive way. Science and technology have historically been rooted in the white community of South Africa. Now there's a tremendous impetus to train the next generation of all South Africans."

Thackeray will be honored again this fall when he receives the 2005 Research Award of the Battery Division of the Electrochemical Society and presents an award address summarizing his career as a leading researcher in the field of lithium-ion batteries.

Submitted by DOE's Argonne National Laboratory